February 11, 2011 Meeting

Bridge and Structures Office
Tumwater, WA

Attendees:

WSDOT	ACEC	Guests
Geoff Swett	Paul W. Guenther (CH2M HILL)	None
~~Eric Schultz~~	~~David Goodyear (TY Lin)~~	
~~Jesse Beaver~~	~~Jim Schettler (Jacobs)~~	
Scott Sargent	~~Richard Patterson (AECOM)~~	
Jeri Bernstein	~~Chester Werts (HDR)~~	
	Jake Menard (DEA)	
	Bill Elkey (Parsons)	

Agenda:

1. Review and approve meeting minutes
2. Discuss Action Items assigned to committee members at the January Meeting.
3. Review last month's action items and assign TBD to committee members.
4. Continue the Balanced Stiffness Discussion
5. Discuss approach to standard plans for moment slabs (what are the concerns / issues and how can they be addressed)
6. Discuss approach to standard plans for sign bridges (what are the concerns / issues and how can they be addressed)
7. Discuss approach to standard plans for drilled shafts for sign bridges (what are the concerns / issues and how can they be addressed)
8. Review the D/B Structural Issues & Outcomes Matrix for specific items of interest and future development.

9:00 to 9:15		• Meeting Minutes and Agenda Review
Meeting minutes were reviewed by the team and approved after a few minor edits.		
9:15 to 10:00		• Review of Action Items from last month
• Ask Prof. Stanton if we can put his presentation on the ACEC/WSDOT website (Geoff Swett) *Complete* • Develop draft for abutment on MSE for BDM (text and figures) (Jim Schettler) *Jim is still working on this; Jake is willing to help* • Verify ACEC sponsor for the Team Charter(Jim Schettler) *Complete* • Post Team Charter to the Committee's website (Geoff Swett) C*omplete* • Look at new standard plans for: *Will be discussed during the meeting* o Moment Slabs (TBD) o Sign Bridges (TBD) o Drilled Shafts for Sign Bridges (TBD) • D/B Matrix Item #12 – Load Distribution on 100" girders (Paul Guenther) • D/B Matrix Item #14 – Guidance on bridge skews greater than 30 degrees (TBD) • SW Line Bridge Nalley Valley PT Seg PC Conc Box Design & Constr Presentation – Eric Schultz (during lunch) *Eric unable to attend, scheduled for next months meeting*		

Action Items Cont.

- Balanced Stiffness Discussion: *(see discussion item below in minutes)*
  - Penalty on the demand displacement ID a factor (such as 1.2) and suggest a basis for the factor (TBD)
  - The principles used in the IBC for relative stiffness may be applicable to bridge design. Future investigation is warranted (Bill Elkey)
  - Future investigation is warranted to investigate the effect that stiffness has on the demand capacity, including a search for existing parametric studies that have been performed in the past. (Paul Guenther)
  - Future investigation is warranted to look at an example bridge for effect of the 1.2 factor. (Eric Schultz)
  - A discussion with Roy Ibsen about the basis of the relative stiffness recommendation and his perspective of a blanket mandatory requirement would be helpful.
  - Identify and lead a discussion on proposed method limitation guidance for the BDM, particularly in regard to Design-Build. (f'c variations within bridge substructure elements; the use of column silos below grade, 1 diameter? 15 feet ? can the maximum increased with camera inspection?; etc.) (TBD)

Forward WSF H-Span LL Design Criteria Presentation to WSDOT / ACEC team (Jeri Bernstein)

10:00 to 11:15		• Continue Balanced Stiffness Discussion

The group continued the discussion on balanced stiffness. Bill reviewed the IBC and did not find a lot of pertinent information that could be applicable to bridge structures but did find some information in Priestley's book "Seismic Design and Retrofit of Bridges." Bill went on to explain that the text discussed the potential added shear demand on columns that may occur due to the torsional effects of a structure, where the center of mass and center of rigidity are not in the same location. This additional shear may or may not be accounted for properly in the design. The team discussed that the additional displacement demand from the torsional effects should be captured in a typical response spectrum, which would then be checked in a transverse pushover analysis. In the transverse bent analysis the plastic shear corresponding to the plastic moments will be calculated and the columns are designed for this plastic shear. However, there may be additional shear demands from the torsional effects that are not accounted for. Even if a displacement demand factor (such as 1.2) was applied to structures that do not meet the balanced stiffness requirements, it is not clear that all the shear demands are accounted for. The team discussed that it may be more appropriate to require the designer to demonstrate through analysis that all loads are accounted for, rather than to apply a factor. Maybe both will be appropriate.

Bill was going to continue his research on the subject. Paul is going to work on his action item to search for existing parametric studies for the next meeting. Eric is also tasked with investigating an example bridge applying the factor (1.2).

The team also discussed identifying methods for balancing stiffness that would <u>not</u> be allowed in the BDM. Jake was going to develop a draft list of these items for next meeting. One of the options is to silo the column down to top of foundation elevation. A limit on length of silo needs to be defined. The team discussed the option to inspect the plastic hinge region by using a camera down the annular space between the column and silo. Geoff will check with the Bridge Preservation engineers to see what their camera capabilities are.

The goal at the next meeting is to have a working session to develop a draft/proposed section for the BDM with the idea of presenting to Bijan at the April meeting.		
11:15 to 11:25		• Moment Slab Standard Plans Discussion
Currently WSDOT is requiring the wall manufacturers to update their designs to LRFD. As part of this update moment slab designs should be addressed. The team agreed to wait and see what design criteria/details are developed during the update to LRFD. Geoff will check with Monique Pawelka, wall specialist in the Bridge Office, on status.		
11:25 to 11:35		• WSF H-Span LL Design Criteria Presentation and Terminal Design Criteria Development
Geoff will distribute presentation to the team. If anyone has additional comments, please forward to Jeri. Jeri's group at the Ferries Division is currently working on design criteria for replacement of their terminals. Jeri raised the question about what code or codes should be used for the basis of their design. They currently are looking at AASHTO and the Marine Oil Terminal Facilities manual. Paul has some experience in this area and was going to research various references and will report back to Jeri. Once a draft document is completed she will present to the team for review and comment.		
11:35 to 11:45		• Standard Plans for Sign Structures and Sign Structure Foundations and other various elements.
The idea was raised about the possibility of turning the sign structures into standard plans, including the sign structure foundations. These standards would be intended to work for most situations and special designs would only be required for unusual situations. Geoff will discuss internally and get back to the team. Bill raised the question about a standard safety railing behind Hilfiker walls, which were used on the SR532 project. Typically safety rail is attached to the concrete fascia or precast panels. A custom design was required, which after discussing with the group may be the best approach. It could also be passed on to the wall manufacturer to be part of their wall design.		
11:45 to 12:00		• Review and Discuss D/B Structural Issues & Outcomes Matrix
General discussions of some specific items from the Matrix were reviewed.		
Action Items:		

• Develop draft for abutment on MSE for BDM (text and figures) (Jim/Jake)
• Look at new standard plans for: (Geoff will discuss internally and report back)
  o Sign Bridges
  o Drilled Shafts for Sign Bridges
• Update of walls to LRFD (Geoff to check with Monique, wall specialist)
• D/B Matrix Item #12 – Load Distribution on 100" girders (Paul Guenther)
• D/B Matrix Item #14 – Guidance on bridge skews greater than 30 degrees (TBD)
• SW Line Bridge Nalley Valley PT Seg PC Conc Box Design & Constr Presentation – Eric Schultz (during lunch in March)
• Balanced Stiffness Discussion:
  o Continue research on the torsional effects due to out of balance structures (Bill)
  o Future investigation is warranted to investigate the effect that stiffness has on the demand capacity, including a search for existing parametric studies that have been performed in the past. (Paul Guenther)		

- Future investigation is warranted to look at an example bridge for effect of the 1.2 factor. (Eric Schultz)
- A discussion with Roy Ibsen about the basis of the relative stiffness recommendation and his perspective of a blanket mandatory requirement would be helpful. (Geoff will try and contact him.)
- Identify method limitation guidance for the BDM, particularly in regard to Design-Build. (Jake to develop draft list; Geoff to check with BPO on camera capabilities for inspecting down silos)

- Forward WSF H-Span LL Design Criteria Presentation to WSDOT / ACEC team (Geoff)
- Research available design criteria that could be used for development of WSF Terminal Design Criteria (Paul)

1:00		Adjourn

Next meetings:
March 25th, 2011 – DEA – Bellevue
April 22nd, 2011 – WSDOT
May 20th, 2011 – Parsons - Seattle